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ABSTRACT

This paper acknowledges that research on school dropouts presents problems in the definitions and computation of dropout indices. It considers a variety of methods for computing dropout rates, using dropout rates which are real and which were available at the end of the 1986-1987 school year. Fall enrollment, average daily membership, and total population are presented as three ways of measuring enrollment during the 1986-1987 school year. Data from student withdrawal records is categorized under the headings of no-shows, voluntary dropouts, walkaways, and involuntary withdrawals. Five methods are discussed for computing dropout statistics in the area of attendance and non-attendance, and the differences in the dropout rates obtained by each of these methods are described. Two methods are described for computing statistics on dropouts and no-shows, one longitudinal method is presented, and four cohort-longitudinal methods are discussed. Results of different methods are presented in data tables, with table 7 summarizing the dropout rates computed by the 12 methods. Table 7 illustrates that the rates range from a low of 7.1, computed by comparing the change in enrollment from one grade level to the next for 1 year, to a high of 64.7, computed by tracking a cohort over 6 years, through to graduation. It is noted that dropout rates computed over secondary schools as opposed to high schools are generally lower, and that cross-sectional rates are always lower than longitudinal rates.
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School Dropout Indices: Its a Matter of Definition¹

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Contemporary interest in the problem of school dropouts is intense. There has been more literature devoted to the topic in the past two years than in the previous ten. Several recent, major reviews have described the problem well: the collection of papers edited by Denton (1987) for the Phi Delta Kappa, CEDR Hot Topic Series; the special issue of the Teachers College Record on school dropouts edited by Nateriello (1986); the recent RER review by Rumberger (1987); and the special report from the Department of Education's Office of Educational Research and Improvement (OERI, 1987).

While not the most important, one of the concerns brought out in all these publications is the problem of definition and computation of dropout indices. While nearly all definitions and methods for computing rates share some features there is enough variation to make comparisons among estimates computed by different agencies difficult at best. For instance, it makes a difference whether a dropout rate is computed as the average rate by grade level per year (a cross-sectional estimate) or as the percentage loss from a cohort over time (a longitudinal estimate). It also makes a difference whether the denominator used in computing the rate includes (or excludes) students who are expected to be enrolled at the beginning of the year but fail to show up.

In this paper I consider a variety of methods for computing dropout rates. The methods differ in several ways, some of which are subtle, from the type of data used to the definitions of cohorts. The data used in computing the dropout rates are real and were available at the end of the 1986-87 school year.

It is not intended that the methods presented constitute an exhaustive set. Indeed, it would appear that there are as many ways to compute dropout indices as there are researchers willing to invest the time dreaming them up. Fortunately, there is a movement at the national level to encourage consensus among state and local agencies regarding standards for the measurement and collection of data on school dropouts (Williams, 1987; Wittenbols & Triplett, 1986).

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Enrollment and Attendance
Data Sets

Several sets of data were available from which dropout rates at the end of the 1987 school year could be estimated. These are summarized in Table 1, sections (a), (b), and (c). A description of the data sets follows.

Three ways of measuring enrollment during the 1986-87 school year are given in section (a). First is the fall enrollment, a census taken during the middle of October, after six weeks of school. These counts constitute what is generally considered to be the "official" enrollment in that they are reported annually to the state education agency. The average daily membership is computed from daily attendance records and reflects the average number of students on the district's rolls on any given day. Since enrollment in the Dallas school district typically reaches a peak sometime during the first few months of the school year, the average daily membership is usually less than the beginning fall enrollment. However, in 1986-87, grade 8 was an exception. The counts under the total population column give the numbers of students ever enrolled during the school year. These counts grow continuously throughout the year; they increase whenever a student enrolls (for the first time) in a district school.

Section (a) contains one additional column of counts, the non-attenders. These are tabulations of students who stopped attending at some point during the school year. When students notified their school that they were dropping out of school they were added to this tabulation. In addition, all those students identified as having both been absent 15 days or more and failed all graded classes due to excessive absences were included in these counts.

The next section of Table 1 gives dropout statistics computed from notices of student withdrawal generated by schools' attendance offices. Whenever a student is withdrawn from a school, the school's attendance office is required to file a form giving the student's identification number, current grade level, and reason for withdrawal. Data from this form eventually are coded and posted to the district's computerized student database. When completing this form, personnel in the schools' attendance offices have a wide selection of "reasons" for withdrawal to choose from. Not all for these reasons imply dropping out of school. In fact the reasons can be roughly categorized into four categories:

no-shows - students expected to be enrolled at the beginning of the school year, but never show up;

voluntary dropouts - students who notify their school that they will no longer be attending, there or elsewhere;

walkaways - students who simply stop attending yet never notify their school of their intentions; and

Table 1
Enrollment and Attendance Statistics
Used In Computing Various Dropout Statistics

(a) Cross-Sectional Enrollment Statistics
for The 1986-87 School Year

Grade Level	Fall Enrollment	Ave. Daily Membership	Total Population	Non-Attendees
7	10508	10149	11812	1520
8	8982	9094	10708	1250
9	12782	12126	14408	3322
10	8090	7749	9033	1527
11	6823	6462	7353	1120
12	6141	5929	6869	809
7-8	19490	19243	22520	2770
9-12	33936	32266	37663	6778
Total	53326	51509	60183	9548

(b) Statistics on School Leavers
for The 1986-87 School Year

Grade Level	Base Population	Number No-Shows	Other Dropouts	Total Dropouts
7-8	23653	1789	2315	4104
9-12	39437	3254	5238	8488
Total	63256	5121	7618	12739

(c) Class of 1987 Cohort Statistics

Grade 7, 1981-82 Cohort

EOY, grade 6, spring 1981.....	11541
BOY, grade 7, fall 1981.....	11035
Graduated on time (spring 1987).....	4071
Enrolled (or expected to be) in fall 1987.....	730
No-Shows between fall 1981 and spring 1987.....	2584
Other Dropouts between fall 1981 and spring 1987..	3256

Grade 9, 1983-84 Cohort

EOY, grade 8, spring 1983.....	13451
BOY, grade 9, fall 1983.....	12539
Graduated on time (spring 1987).....	4824
Enrolled (or expected to be) in fall 1987.....	724
No-Shows between fall 1983 and spring 1987.....	2652
Other Dropouts between fall 1983 and spring 1987..	3923

involuntary-withdrawals - students who are withdrawn from school for various reasons beyond their control (e.g. expulsion, incarceration, institutionalization, health, death).

In computing dropout rates it makes some sense to classify as dropouts all students in the first three categories. It will be useful, however, to keep a distinction between the no-shows and the other dropouts. This has been done in section (b). In the table the base population consists of all students ever enrolled plus the total number of dropouts. The difference between the total population given in section (a) and the base population given here is the number of no-shows.

Section (c) displays summary enrollment and attendance statistics for two cohorts of the Class of 1987: the cohort of the Class of 1987 that began as seventh-graders, in the district, in fall 1981; and the cohort of the Class of 1987 that began as ninth-graders in fall 1983. These, obviously, are not mutually exclusive groups.

For each cohort the expected enrollment at the beginning of the base year (i.e., the end of year enrollment the previous year) is given along with the actual enrollment at the beginning of the base year. In addition, the numbers of students graduating with their class (on time) are given as are the numbers of students who were still enrolled at the beginning of the 1987-88 school year. Finally, the table gives the total numbers of no-shows and other dropouts throughout the cohort periods. These latter statistics are defined as they were in section (b) of the table.

These, except for a few instances in which additional figures are introduced, constitute the data sources from which the various dropout rates explored in this paper are computed.

Methods of Computing Dropout Statistics

Attendance and Non-attendance. One of the first problems encountered when trying to decide upon an appropriate computational procedure is the choice of numerator and denominator. Section (a) of Table 1 offers a choice among three candidates for denominator and, apparently, only one candidate for numerator -- the number of non-attenders. These give rise immediately to three methods for computing a dropout rate for 1986-87:

method 1. Divide the number of known non-attenders by the fall enrollment. For some districts, fall enrollment might be the only reliable enrollment count available,

method 2. Divide the number of non-attenders by the average daily membership (ADM). This would probably constitute an improvement over method 1 in that, as an average taken over the school year, ADM could be taken as a more reliable, if not practical, estimate of the districts enrollment, and

method 3. Divide the number of non-attenders by the total population. Since the total population is comprised of all students ever enrolled throughout the school year, including the non-attenders and late enrollees, it is probably the strongest candidate, of the three, for a base against which to compute a dropout rate.

The argument in favor of method 2 is that ADM is probably the best statistic for estimating the district's enrollment. However, the number of non-attenders is not an average but an actual tabulation. To some extent the ADM is attenuated by this tabulation. It might be better, then, to modify the denominator in method 2 by adding the number of non-attenders to it. This has been done as method 4.

Finally, it might be argued that the count, the number of non-attenders, is itself inaccurate. Indeed, it depends heavily upon accurate recordkeeping in the schools -- something we know to be quite variable among schools. Furthermore, the operational definition upon which non-attendance is based (in this case formal notification of dropping out, or 15 days absence and failure in all graded courses) is subject to yearly modification (it will go to 30 days absence this year, in response to state statute). For these and possibly other reasons a dropout rate that is not dependent upon a tabulation of non-attenders might be desirable. The difference between the total population and the ADM is a good estimate of the number of students lost from the school district. Dividing this estimate by the total population yields a fifth method, method 5, of computing a dropout rate.

Using the summary statistics given in section (a) of Table 1, dropout rates were computed by each of the five methods just described. These are given by secondary school grade level, for junior and senior high schools, and for all secondary schools in Table 2. As can readily be seen, the dropout rates computed by the five methods varied considerably. Generally the rate computed by method 2 (number of non-attenders divided by ADM) yielded the highest rate, except for grade 8 and, because of this, junior high schools (grades 7-8, combined). Method 3 (number of non-attenders divided by total population) gave the lowest dropout rate for junior high schools and grade 12, while method 5 (the difference between total population and ADM divided by total population) gave the lowest rate for high schools (except grade 12).

It is not surprising that method 3 resulted in the lowest dropout rate for grades 7 and 8. It will be recalled that the tabulation of non-attenders includes, in addition to excessive absenteeism, students who formally dropout of school. However, in Texas anyway, students in grades 7 and 8 typically are not old enough to be allowed to drop out. Therefore very few students formally dropout at these grade levels. This yields a smaller relative number of non-attenders. In high school, on the other hand, where students are old enough to drop out of school, the number of non-attenders identified by reasons other than excessive absenteeism increases dramatically (this is especially evident at grade 9).

Another point concerning choice of dropout rates can be made from the results given in Table 2. Except for method 5 all the rates were lower

Table 2

Dropout Rates Computed From Measures of
Non-Attendance and Various Estimates of Enrollment

Grade Level	Method 1 Rate	Method 2 Rate	Method 3 Rate	Method 4 Rate	Method 5 Rate
7	14.47	14.98	12.87	13.03	14.08
8	13.92	13.75	11.67	12.08	15.07
9	25.99	27.40	23.06	21.50	15.84
10	18.88	19.71	16.90	16.46	14.21
11	16.42	17.33	15.23	14.77	12.12
12	13.17	13.64	11.78	12.01	13.63
7-8	14.21	14.39	12.30	12.58	14.55
9-12	19.97	21.01	18.00	17.36	14.33
Total	17.90	18.54	15.86	15.64	14.41

Note: The source for all computations in this table is section (a) of Table 1. Methods 1 through 4 used the number of non-attenders as the numerator. The denominators for each of these were fall enrollment for Method 1; average daily membership (ADM), Method 2; total population, Method 3; and the sum of ADM and the number of non-attenders for Method 4. Method 5 subtracted ADM from the total population and divided the difference by the total population.

Table 3

Dropout Rates Computed From
School-Generated Counts of Dropouts

Grade	No-Show Rate	Other Rate	Method 6
7-8	7.56	9.79	17.35
9-12	8.25	13.28	21.52
Total	8.10	12.04	20.14

Note: The source for these computations is section (b) of Table 1. The "no-show" rate is computed by dividing the number no-shows by the base population. The "other" rate is computed by dividing the other dropouts by the base population. Method 6 divided the total number of dropouts (no-shows plus other dropouts) by the base population.

when aggregated over all secondary schools then when aggregated over just high schools. Method 5 yielded similar results whether aggregated over just junior high schools, just high schools, or all secondary schools. The point is that "high school" dropout rates typically will be higher than "secondary school" dropout rates.

Dropouts and No-Shows. The data for the counts given in the second section of Table 1 originate in the schools. As mentioned earlier, when a student withdraws from school, either by notifying the school's attendance office or simply by walking away, or when a student fails to enroll in the fall semester as expected, a notice of withdrawal is filed for the student. This notice contains data that eventually get entered into the the district's computerized, student database. In turn, these data can then be used to classify withdrawals in various ways. In particular, we can identify as "no-shows" those students who fail to enroll as expected and other types of students who withdraw for reasons other than those which would imply matriculation elsewhere. For convenience these other types of withdrawals have been labeled "other dropouts".

The data in section (b) of Table 1 yield three additional rates of student withdrawal: a no-show rate, an "other" dropout rate, and an overall dropout rate, the latter of which will be referenced alternatively as method 6. These rates are given in Table 3 where it is obvious that the overall dropout rates (method 6) are higher than any of the corresponding rates from Table 2. Again, the "secondary" rate is slightly lower than the high school rate.

The major differences between the data used to generate the results shown in Table 3 and those in Table 2 is the inclusion of "no-show". The enrollment figures in section (a) of Table 1 are for the 1986-87 school year (September to June) only and do not include students that failed to enroll in September as expected. Section (b) on the other hand includes these students in the base population; therefore, they also are included in both the numerator and denominator of the rate given by method 6.

One way to take summer dropouts into account when computing dropout rates from enrollment statistics is to compute the rates on a fall-to-fall, -grade-to-grade basis. Using this method, we would divide the difference in enrollment between a grade level in the current year and the next lower grade level the previous year by the enrollment in the lower grade the previous year. This has been done in Table 4 where method 7 generates dropout rates by grade level based upon change in enrollment from one year to the next.

One difficulty with this method is obvious immediately. Rather than yielding a "dropout" rate for grades 7 and 9 the method yields a "drop-in" rate. In the Dallas school district, as is true of several other large-city school districts, there usually is a larger than average influx of new students at these grade levels. For the most part these increases result from students previously in private and parochial schools.

Another problem with this method, particularly in high school, is that dropout rates decrease with increase in grade level. This is to be expected, however. Among the many factors known to contribute to the

Table 4

Dropout Rates Computed From One-Year,
Grade to Grade, Fall to Fall Enrollment Changes

Grade Level	Enrollment			Method 7 Dropout Rate
	Fall 1986	Prv. Gd.*	Change	
7	10508	9267	1241	[11.81]
8	8982	10413	-1431	15.93
9	12782	9144	3638	[28.46]
10	8090	12303	-4213	52.07
11	6823	8473	-1650	24.18
12	6141	7486	-1345	21.90
7-8	19490	19680	-189	0.97
9-12	33836	37405	-3569	10.55
Total	53326	57085	-3579	7.05

*The counts given in this column cannot be found in Table 1. These are the enrollments from the fall of the previous year, one grade level lower; e.g., the sixth-grade fall enrollment in 1985 was 9267

Table 5

Dropout Rates Computed From Multi-Year
Grade to Grade, Fall to Fall Changes in Enrollment

Grade Level Base Year	Base Enrollment	Grade 12 Fall 1986	Enrollment Reduction	Method 8 Rate
Grade 7, Fall '81	11035	6141	4894	44.35
Grade 9, Fall '83	12539	6141	6398	51.02

likelihood that a student will become a dropout are retention in grade level and/or overage relative to peers. Both of these factors are indicators of poor academic performance. It is obvious that students weighted high on these factors are more likely to be found in lower high school grade levels than higher grade levels.

The aggregate dropout rates produced by method 7, therefore, are misleading. The very low rate for junior high schools (grades 7 and 8) is due primarily to the nearly 12 percent increase in enrollment at grade 7. The rate for high schools, while much higher than that for junior high schools, is still severely attenuated by the huge increase in enrollment (over 28 percent) at grade 9.

Longitudinal Methods. Until now the methods we have examined for computing dropout rates have all used cross-sectional statistics for a single year. An alternative approach is to look at the rate of dropping out from a cohort or class of students.

Most school districts will have some sort of official enrollment count, by grade level, taken annually at about the same time each year. This leads to one of the most popular procedure for computing dropout rates -- the decrease in enrollment from grade 9 one year to grade 12 three years later. For a "secondary school" dropout rate we would look at the difference between grade 7 and grade 12 five years later.

This procedure, method 8, was used to compute the dropout rates shown in table 5. The enrollments for grades 7 and 9 were taken from section (c) of Table 1. The rates are much higher than any we have seen earlier. Again, this is not unexpected. In fact, Stephenson (1985) has shown that, mathematically, longitudinal-based dropout rates are at least as large, and except in unusual cases, generally larger than cross-sectional-based dropout rates.

Cohort-Longitudinal Methods. Method 8 used a sort of "quasi-cohort" longitudinal approach. The students in grade 7 (or 9) in fall 1981 (or fall 1983) were not actually tracked over five (or three) years. The procedure assumes that enrollment patterns and in- and out-migration rates remain fairly stable over years so that the reduced class size in grade 12 in 1986-87 is a fair representation of the loss of students from the corresponding ninth or seventh grade class 3 or five years earlier.

The next four methods are based upon a true cohort-longitudinal approach. In each method a true cohort of students is followed over nearly four or six years. The methods differ both in terms of defining the base year (i.e., in term of when the cohort is selected) and in terms of who is counted as having dropped out. In method 9 and method 10 the cohort is defined as all students present at the end of grade 6 or grade 8 at the end of the 1981-82 or 1983-84 school year, respectively. The two methods differ in terms of the way students are counted as having been lost from the cohort. In method 9 all students not graduated by the end of the 1986-87 school year are counted as having dropped out. In method 10, those students still enrolled (or expected to be) in 1987-88 are recovered (not counted as dropouts).

Method 11 and method 12 define the cohorts as students present at the beginning of the school year. The two methods differ in the same way as methods 9 and 10, i.e., in method 11 all students not graduated by the end of 1986-87 are counted as dropouts while in method 12 those students still expected to be enrolled in fall 1987 are not counted as dropouts.

The results of these four methods are given in Table 6. In all cases the dropout rates are higher than any computed by previous methods. As might be expected, the cohorts composed of students present at the end of the year (methods 9 and 10) showed a higher rate of dropout due to the loss of students over one additional summer. Also as might be expected, those methods (9 and 11) which counted as a dropout any student that did not graduate on time with his class yielded higher dropout rates than those that did not count as dropouts those students retained yet still enrolled.

Summary and Conclusions

The dropout rates computed by the dozen or so methods presented earlier are summarized in Table 7. The rates range from a low of 7.1 (method 7), computed by comparing the change in enrollment from one grade level to the next for one year (fall to fall), to a high of 64.7 (method 9a), computed by tracking a cohort over six years, through to graduation. As was noted earlier, dropout rates computed over secondary schools as opposed to just high schools are generally lower. Also, cross-sectional rates are always lower than longitudinal rates.

Anyone who has worked with dropout statistics is probably aware that in a strict sense, all the rates computed for this paper are not really dropout rates, but their close cousin: measures of holding power. In other words, we probably can never know for sure whether a student has forsaken the goal of a formal education. According to census data many students who leave school early eventually return to complete requirements for a high school diploma or its equivalent. Whether these individuals are actually "dropouts" is a philosophical issue that can be debated endlessly. On the other hand, there is less disagreement over the concept of a school's or school district's holding power. Generally this is taken as a measure of a school's or district's ability to keep its students until they graduate.

Table 6

Cohort-Longitudinal Methods
For Computing Dropout Rates

Cohort	Method 9	Method 10	Method 11	Method 12
Grade 7, 1981-82	64.73	58.40	63.11	56.49
Grade 9, 1983-84	64.13	58.75	61.53	55.75

Note: The data source for this table is Table 1, Section (c). The basis for the four methods were as follows: Methods 9 and 10 used end-of-year (EOY) enrollment from grade 6 (or grade 8) in 1980-81 (or 1982-83); Methods 11 and 12 used beginning-of-year (BOY) enrollment in grade 7 (or grade 8) in 1981-82 (or 1983-84). Only graduates from the cohorts were subtracted from the basis in Methods 9 and 11, while the graduates plus the numbers of students still enrolled were subtracted from the basis in Methods 10 and 12.

Table 7

Summary of Dropout Rates
Produced by Various Methods

Mth.	Numerator	Denominator	Rate
1	number of non-attenders	fall enrollment	17.9
2	number of non-attenders	average daily membership	18.5
3	number of non-attenders	total population	15.9
4	number of non-attenders	average daily membership plus number of non- attenders	15.6
5	total population plus average daily member- ship	total population	14.4
6	no-shows and other dropouts	all students ever enrolled or expected to be enrolled	20.1

(Continued on next page)

Table 7 (Continued)

Mth.	Numerator	Denominator	Rate
7	change in enrollment from previous fall to current fall	previous year's fall enrollment	7.1
8a	difference in enrollment between grade 9 three years earlier and grade 12, now	enrollment in grade 9 three years earlier	44.4
8b	difference in enrollment between grade 7 five years ago and grade 12, now	enrollment in grade 7 five years earlier	51.0
9a	size of end-of-year seventh-grade cohort less the number of graduates	size of end-of-year seventh-grade cohort (grade 6, spring 1981)	64.7
9b	size of end-of-year ninth-grade cohort less the number of graduates	size of end-of-year ninth-grade cohort (grade 8, spring 1981)	64.0
10a	size of end-of-year seventh-grade cohort less the number of graduates and retainees	size of end-of-year seventh-grade cohort (grade 6, spring 1981)	58.4
10b	size of end-of-year ninth-grade cohort less the number of graduates and retainees	size of end-of-year ninth-grade cohort (grade 8, spring 1981)	58.8
11a	size of beginning-of-year, seventh-grade, fall 1981 cohort less the number of graduates	size of beginning-of-year, seventh-grade, fall 1981 cohort	63.1
11b	size of beginning-of-year, ninth-grade, fall 1983 cohort less the number of graduates	size of beginning-of-year, ninth-grade, fall 1983 cohort	61.5
12a	size of beginning-of-year, seventh-grade, fall 1981 cohort less the number of graduates and retainees	size of beginning-of-year, seventh-grade, fall 1981 cohort	56.5
12b	size of beginning-of-year, ninth-grade, fall 1983 cohort less the number of graduates and retainees	size of beginning-of-year, ninth-grade, fall 1983 cohort	55.8

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